Listing of the Claims

1. (Previously Presented) A method for oxidizing a layer, comprising the following steps, carried out without restriction in the order indicated:

providing a substrate, which bears a layer which is to be oxidized, the layer which is to be oxidized being part of a layer stack which includes the substrate or a base layer at a base surface of the layer which is to be oxidized, and a neighboring layer which adjoins a surface of the layer to be oxidized which is remote from the base surface, and the layer which is to be oxidized being uncovered in an edge region of the layer stack;

introducing the substrate which bears the layer stack into a holding device;

introducing the holding device into a heating device;

passing an oxidation gas onto the substrate;

heating the substrate to a process temperature, the layer which is to be oxidized, as the oxidation time continues, being oxidized ever further from an edge into the layer stack under the influence of the oxidation gas at the process temperature,

recording the process temperature during the processing by recording a temperature of the holding device; and

controlling the temperature of the substrate to a predetermined desired temperature or a predetermined desired temperature curve during the processing.

2. (Previously Presented) The method as claimed in claim 1, wherein at least one of:

a main surface of the substrate contacts a main surface of the holding device or is arranged at a distance of less than

three millimeters from the main surface of the holding device,

a 10°C deviation in the process temperature causes an oxidation width to deviate by more than 5%,

the layer which is to be oxidized contains a semiconductor material which is doped with a metal,

the substrate contains gallium arsenide,

the layer which is to be oxidized is arranged between two layers which are not to be oxidized during the processing,

the process temperature is between 100°C and 500°C,

in which the oxidation width is dependent on the process temperature,

and in which the substrate is processed in a single-substrate process in the heating device.

3. (Cancelled)

4. (Previously Presented) The method as claimed in claim 1, wherein a heat-up time of the heating device from a start of a heating operation until the process temperature is reached is less than five minutes, the process temperature is between 350°C and 450°C, and at least one of:

a temperature of less than 50°C prevails in the heating device at the start of the heating operation,

and a residence time of the substrate in the heating device is less than fifteen minutes.

5. (Previously Presented) The method as claimed in claim 1, wherein during the heating of the substrate to the process temperature at least one preheating step is carried out, in which the temperature in the heating device is held at a preheating

temperature, which is lower than the process temperature and higher than a condensation temperature of the oxidation gas or a gas which has been admixed with the oxidation gas, for at least ten seconds,

and wherein the oxidation gas starts to be admitted to the heating device before the preheating temperature is reached or at the preheating temperature.

6. (Previously Presented) The method as claimed in claim 1, wherein at least one of: the holding device is covered by a cover and the cover rests on an edge of the holding device or is held at a predetermined distance from the edge.

7. (Previously Presented) The method as claimed in claim 1, wherein the substrate comprises a circular base surface, and at least one of:

the holding device, in a circumferential direction of the substrate, comprises a recess into which a ring is placed,

and the heating device includes straight heating elements or spot-like heating elements.

8. (Previously Presented) The method as claimed in claim 1, wherein the heating device can achieve heating rates of greater than 8°C per second,

wherein the layer stack includes a layer whose edge projects beyond the stack,

and wherein the heating-up to process temperature is carried out at a heating rate of less than 6°C per second.

9. (Previously Presented) The method as claimed in claim 1, further comprising interrupting the oxidation before a desired oxidation width is reached;

recording an oxidation width;

performing a post-oxidation of the layer which is to be oxidized as a function of the recorded oxidation width.

10. (Previously Presented) The method as claimed in claim 1, wherein the oxidation gas contains oxygen in a form bonded to at least one other element,

and wherein the level of molecular oxygen during processing is less than 1%.

11. (Previously Presented) The method as claimed in claim 1, wherein the temperature of the holding device is recorded using a pyrometer or using at least one thermocouple.

12. (Previously Presented) The method as claimed in claim 1, in which the oxidized layer is used in an electronic component with electrical contacts, and at least one of:

a contact resistance of the electrical contacts being less than 5 times 10^{-6} Ω /cm^{-2} or being lower than the contact resistance which is produced in a conventional furnace process using otherwise identical materials,

and the electronic component is an integrated vertical laser unit.

13. (Withdrawn) A holding device, containing a layer to be oxidized by the following steps carried out without restriction in the order indicated: providing a substrate, which bears a layer which is to be oxidized, the layer which is to be oxidized being part of a layer stack which includes the substrate or a base layer at a base surface of the layer which is to be oxidized, and a neighboring layer which adjoins a surface of the layer to be oxidized which is remote from

the base surface, and the layer which is to be oxidized being uncovered in an edge region of the layer stack; introducing the substrate which bears the layer stack into a heating device; passing an oxidation gas onto the substrate; heating the substrate to a process temperature, the layer which is to be oxidized, as the oxidation time continues, being oxidized ever further from an edge into the layer stack under the influence of the oxidation gas at the process temperature; recording the process temperature during the processing via a temperature of the holding device which holds the substrate; and controlling the temperature of the substrate to a predetermined desired temperature or a predetermined desired temperature curve during the processing, the holding device:

having a flat base body which contains graphite,

and having a recess which is matched to a substrate,

and includes an outer coating.

14. (Withdrawn) The holding device as claimed in claim 13, wherein the coating contains graphite.

15. (Withdrawn) A holding device containing a layer to be oxidized by the following steps, carried out without restriction in the order indicated: providing a substrate, which bears a layer which is to be oxidized, the layer which is to be oxidized being part of a layer stack which includes the substrate or a base layer at a base surface of the layer which is to be oxidized, and a neighboring layer which adjoins a surface of the layer to be oxidized which is remote from the base surface, and the layer which is to be oxidized being uncovered in an edge region of the layer stack; introducing the substrate which bears the layer stack into a heating device; passing an oxidation gas onto the substrate; heating the substrate to a process temperature, the layer which is to be oxidized, as the

oxidation time continues, being oxidized ever further from an edge into the layer stack under the influence of the oxidation gas at the process temperature; recording the process temperature during the processing via a temperature of the holding device which holds the substrate; and controlling the temperature of the substrate to a predetermined desired temperature or a predetermined desired temperature curve during the processing, the holding device, the holding device:

having a flat base body,

having a recess which is matched to a substrate,

and includes a recess, which runs in a circumferential direction of the recess for holding the substrate, for an exchangeable ring.

16. (Withdrawn) The holding device as claimed in claim 15, wherein the holding device contains graphite, further comprising at least two rings made from different materials.

17. (Withdrawn) The holding device as claimed in claim 15, further comprising at least two rings of different thickness.

18. (Previously Presented) The method as claimed in claim 1, wherein a thermal conductivity of the holding device at 20°C is greater than 10 $Wm^{-1}K^{-1}$, and the thermal conductivity of the holding device at the process temperature is greater than a thermal conductivity of the substrate at the process temperature.

19. (Previously Presented) The method as claimed in claim 1, wherein the holding device comprises graphite.

20. (Previously Presented) The method as claimed in claim 19, wherein the holding device comprises at least ninety-percent graphite.